IN THE CLAIMS:

1.   (Currently Amended) An optical disc having recorded therein a digital stream divided into n segments, wherein

an interleave unit is recorded in front of an ith segment to be played back in an ith place, where each of i and n is an integer that satisfies $i<n$, and the interleave unit includes ~~one of~~

5 ~~(a)~~ a program to be synchronized with playback of the ith segment ~~and (b) data to be displayed synchronously with playback of the ith segment~~.

2.   (Currently Amended) The optical disc of Claim 1, wherein

the interleave unit includes ending time information that indicates at which point on a playback time axis of the digital stream the program ~~or the data~~ should be deleted from a memory.

3.   (Currently Amended) The optical disc of Claim 1, wherein

the interleave unit includes start time information that indicates at which point on a playback time axis of the digital stream the program ~~or the data~~ becomes usable.

4.   (Original) The optical disc of Claim 1, wherein

a copy of the interleave unit is recorded between the ith segment and an $i+1$th segment.

5.   (Currently Amended) The optical disc of Claim 4, wherein

a boundary between the ith segment and the $i+1$th segment falls in a middle of a live range of the program ~~or the data~~.

6.   (Currently Amended) The optical disc of Claim 4, wherein

a boundary between the ith segment and the $i+1$th segment falls after a live range

of the program ~~or the data~~.

7.   (Original) The optical disc of Claim 1, wherein

the ith segment is made of a plurality of access units, each access unit containing

video data having an intra picture, and the optical disc has recorded therein map information that

shows the interleave unit in association with one of an address and a playback time of each of the

5   access units belonging to the ith segment.

8.   (Currently Amended) The optical disc of Claim 1, wherein

$i \geq 2$, and a boundary between the ith segment and an $i-1$th segment corresponds

to a start point of a live range of the program ~~or the data~~ on a playback time axis of the digital

stream.

9.   (Currently Amended) The optical disc of Claim 8, wherein

the live range is a section on the playback time axis, during which the program ~~or~~

~~the data~~ becomes usable.

10.   (Original) The optical disc of Claim 1, wherein

the program is an event handler that is driven by an event, and an interleave unit

including the event handler is recorded in front of a time at which the event occurs on a playback

time axis of the digital stream.

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11.   (Original) The optical disc of Claim 10, wherein

the event is one of (a) an event indicating that a current playback time point has

reached a predetermined time on a playback time axis, (b) an event indicating that a user

operation is made during a predetermined time duration of the playback time axis, (c) an event

5   occurring prior to playback according to a playback path, (d) an event occurring after playback

according to a playback path, (e) an event generated by the playback apparatus, and (f) an event

generated by another program.

12.   (Currently Amended) The optical disc of Claim 1, further having recorded therein

interleave-unit general information that shows identifiers of a plurality of interleave units

recorded in the optical disc, in association with a size and a live range of a corresponding

program ~~or data~~.

13.   (Currently Amended) The optical disc of Claim 1, further having recorded therein

playlist information and a dynamic scenario, wherein

the playlist information defines a playback path by disposing pieces of

information indicating playback sections of video data according to a playback order, the

5   dynamic scenario defines a video title by showing a playback procedure of at least one playback

path, and the interleave unit contains an identifier that shows, as a live range of the program ~~or~~

~~the data~~, one of a playback path, a playback section, an entire video title, and a chapter of the

video title.

14.   (Currently Amended) The optical disc of Claim 1, wherein

the interleave unit contains a locator that contains drive information and path

information, the drive information indicating a drive to which the program ~~or the data~~ is to be

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read, and the path information indicating in which layer of a layer structure of the drive the

5   program ~~or the data~~ exists.

16.   (Currently Amended) A playback apparatus for an optical disc having recorded

therein a digital stream, the playback apparatus comprising:

a reading unit operable to read, from the optical disc, an ith segment to be played

back in an ith place from among n segments constituting the digital stream, together with an

5   interleave unit preceding the ith segment, where each of i and n is an integer that satisfies $i < n$;

a playback unit operable to play back the read ith segment; and

a processing unit operable to perform synchronous processing using a program ~~or~~

~~data~~ included in the read interleave unit, in synchronization with playback of the ith segment.

16.   (Original) The playback apparatus of Claim 15, comprising:

a memory operable to store the read interleave unit; and

a track buffer operable to store the read ith segment, wherein

the playback unit receives supply of the ith segment via the track buffer, and the

5   processing unit receives supply of the interleave unit via the memory.

17.   (Original) The playback apparatus of Claim 16, further comprising

a switcher, wherein

the read unit, upon reading a sector of the optical disc, makes a notification of an

address of the sector, the switcher (a) writes information read from the sector to the memory

5   when judging that the notified address from the read unit falls within an area for storing

interleave units, and (b) sequentially writes information read from the sector to the track buffer

when judging that the notified address from the read unit falls within an area for storing

segments, each interleave unit on the memory is made of information that the switcher has written to the memory, and each segment on the track buffer is made of information that the

10   switcher has written to the track buffer.

18.   (Original) The playback apparatus of Claim 17, wherein

in the optical disc, each interleave unit is stored in a file separately from the digital stream, the optical disc has recorded therein file management information that indicates each file identifier in association with an address in the optical disc of one of the digital stream

5   and an interleave unit, and judgment as to whether a current read position is within the area for storing interleave units or within the area for storing segments is performed by referring to the file management information.

19.   (Original) The playback apparatus of Claim 16, wherein

in the optical disc, each interleave unit is stored in a file separately from the digital stream, the optical disc has recorded therein file management information that indicates each file identifier in association with an address in the optical disc of one of the digital stream

5   and an interleave unit, and the read unit, before performing the reading, opens each file for specifying the memory as a reading destination for a file storing an interleave unit, and specifying the track buffer as a reading destination for a file storing the digital stream.

20.   (Original) The playback apparatus of Claim 16, wherein

the interleave unit contains ending time information, and the processing unit deletes the interleave unit from the memory when a current playback time point of the playback unit has reached an ending time that the ending time information indicates.

21. (Currently Amended) The playback apparatus of Claim 16 further comprising a virtual machine subunit, wherein

the processing unit, upon request by an application program, supplies the program ~~or the data~~ in the interleave unit on the memory to a work area of the virtual machine subunit,

5 and has the virtual machine subunit to execute the program ~~or the data~~.

22. (Original) The playback apparatus of Claim 21, wherein

the interleave unit contains start time information, and the processing unit supplies the program to the work area of the virtual machine subunit upon request by the application program when the current playback time point of the playback unit has reached a

5 start time that the start time information indicates, and the current playback time point of the playback unit has not reached the start time, the processing unit does not supply the program to the work area of the virtual machine subunit, even upon request by the application program.

23. (Currently Amended) The playback apparatus of Claim 15, wherein

a boundary between the ith segment and an $i+1$th segment falls in a middle of a live range of the program ~~or the data~~, a copy of the interleave unit is recorded between the ith segment and the $i+1$th segment, and the read unit reads the copy from the optical disc when a

5 random access is performed to the ith segment.

24. (Currently Amended) The playback apparatus of Claim 15, wherein

a boundary between the ith segment and an $i+1$th segment falls after a live range of the program ~~or the data~~, a copy of the interleave unit is recorded between the ith segment and the $i+1$th segment, the read unit reads the ith segment when the playback unit performs normal

5 playback, and the playback unit, when performing reverse playback, reads the $i+1$th segment among the n segments, together with the copy of the interleave unit preceding the $i+1$th segment.

25. (Original) The playback apparatus of Claim 15, wherein

the ith segment is made of a plurality of access units, each access unit containing video data having an intra picture, the optical disc has recorded therein map information that shows the interleave unit in association with one of an address and a playback time of each of the

5 access units belonging to the ith segment, and the read unit performs reading of the interleave unit, by referring to the map information.

26. (Original) The playback apparatus of Claim 15, wherein

the processing unit includes a virtual machine subunit, the playback unit plays back the digital stream and generates an event synchronized with the playback, and the virtual machine subunit, when the playback unit has generated the event, executes the program in the

5 interleave unit.

27. (Original) The playback apparatus of Claim 26, wherein

the event is one of (a) an event indicating that a current playback time point has reached a predetermined time on a playback time axis of video data, (b) an event generated by the playback apparatus, and (c) an event generated by another program.

28. (Original) The playback apparatus of Claim 27, wherein

the optical disc has recorded therein mark information that defines a predetermined time point and a predetermined time interval on the playback time axis, and the playback unit generates the event according to the mark information.

29. (Original) The playback apparatus of Claim 27, comprising a reception unit operable to receive a user operation, wherein

the event is an event that indicates that the reception unit has received a user operation in a predetermined time duration of the playback time axis of the video data.

30. (Original) The playback apparatus of Claim 15, wherein

the optical disc has recorded therein interleave-unit general information being management information for a plurality of interleave units recorded on the optical disc, the playback apparatus includes a memory and a playback control unit that is operable to judge,

5   according to the interleave-unit general information, whether the interleave units are storable in the memory, and the read unit reads part or all of the interleave units when the playback control unit has judged affirmatively.

31. (Original) The playback apparatus of Claim 15, wherein

the optical disc has recorded therein playlist information that defines a playback path by disposing pieces of information indicating playback sections of the digital stream according to a playback order, and the playback control unit controls the read unit and the

5   playback unit so as to play back the digital stream according to the playlist information.

32. (Original) The playback apparatus of Claim 31, wherein

each interleave unit contains an identifier, and the playback control unit, in playing back the digital stream according to the playlist information, controls the read unit to read, from the optical disc, one of (a) an interleave unit containing an identifier of the playlist

5   information and (b) an interleave unit containing an identifier of information that indicates a playback section of the playlist information.

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33.   (Original) The playback apparatus of Claim 31, wherein

the optical disc has recorded therein a dynamic scenario, the dynamic scenario

defining a title by showing a playback procedure of at least one playback path shown by playlist

information, the playback control unit controls the read unit to read, from the optical disc, one of

5   (a) an interleave unit containing an identifier of the title corresponding to the dynamic scenario

and (b) an interleave unit containing an identifier of a chapter included in the title corresponding

to the dynamic scenario.

34.   (Currently Amended) The playback apparatus of Claim 15, wherein

each interleave unit contains a locator that contains drive information and path

information, the drive information indicating a drive to which the program ~~or the data~~ is to be

read, the path information indicating in which layer of a layer structure of the drive the program

5   ~~or the data~~ is to be disposed, and the playback apparatus disposes the program ~~or the data~~ in the

layer indicated by the path information.

35.   (Currently Amended) A computer readable medium storing a playback program

for an optical disc having recorded therein a digital stream to enable a computer to perform the

following steps of the playback program comprising:

a reading step of reading an a ith segment to be played back in an ith place, from

5   among a plurality of segments constituting the digital stream;

a playback step of playing back the read ith segment; and

a processing step of performing synchronous processing using a program ~~or data~~

included in the read interleave unit, in synchronization with playback of the ith segment.

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36.   (Currently Amended) A playback method for an optical disc having recorded therein a digital stream, the playback method comprising:

a reading step of reading an a ith segment to be played back in an ith place, from among a plurality of segments constituting the digital stream;

5   a playback step of playing back the read ith segment; and

a processing step of performing synchronous processing using a program or data included in the read interleave unit, in synchronization with playback of the ith segment.

37.   (Currently Amended) A recording method for an optical disc, the recording method comprising:

a step of creating application data; and

a step of recording the created application data to the optical disc, wherein

5   the application data contains a digital stream divided into n segments and an interleave unit, the interleave unit is recorded in front of an ith segment to be played back in an ith place, where each of i and n is an integer that satisfies $i<n$, and the interleave unit includes one of (a) a program to be synchronized with playback of the ith segment and (b) data to be displayed synchronously with playback of the ith segment.

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